

FUNGI THAT ENTRAP NEMATODES BY MUCILAGINOUS DROPLETS

BORNE ON GLANDULAR CELLS

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INTRODUCTION: Ten species of fungi in two genera, *Arthrobotrys* and *Nematoctonus*, entrap nematodes by means of a glandular cell surrounded by a droplet of colorless, mucilaginous material which is usually borne on an erect hyphal protuberance (Fig. 1-A). Drechsler described the genus *Nematoctonus*, which literally means "thread" and "murder" and which the describer felt was appropriate due to the devastating effect of the fungus on nematode populations (2). Species of fungi that exhibit glandular cells and sticky droplets include: *Arthrobotrys entomopaga* Drechs. (4), *Nematoctonus campylosporus* Drechs. (7), *N. concurrens* Drechs. (6), *N. haptocladus* Drechs. (5), *N. leiosporus* Drechs. (3), *N. leptosporus* Drechs. (3), *N. pachysporus* Drechs. (3), *N. robustus* Jones (10), *N. tripolitanus* Giurma & Cooke (9), and *N. tylosporus* Drechs. (2).

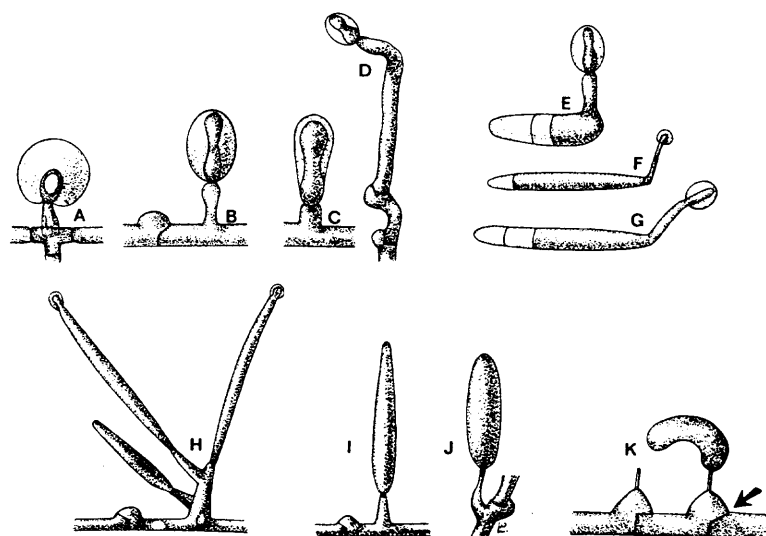


Figure 1. Predacious organ (A-G), and conidial types. A. Large droplet (*Arthrobotrys entomopaga*), B. Ovoid droplet (*Nematoctonus concurrens*), C. Elongate ovoid droplet (*N. robustus*), D. Minute droplet (*N. haptocladus*), E-G. Predacious organs borne on spores, H-K. Conidia borne on sterigmata. H. *N. leptosporus*, I. *N. leiosporus*, J. *N. tripolitanus*, K. *N. robustus*. Arrow: clamp connection. (A,B,D, E,F,G,H & I redrawn after Drechsler. C,K redrawn after Jones. J redrawn after Giurma & Cooke).

CHARACTERIZATION: *Arthrobotrys entomopaga* has septate mycelium and forms a very large droplet of sticky fluid on the ovate glandular cell (Fig. 1-A). Two-celled conidia are borne on a long, erect conidiophore. Species of *Nematoctonus* are characterized by hyphal clamp connections (Fig. 1, arrow), and one-celled conidia usually borne singly on a short sterigma (Fig. 1-H,I,J,K).

Most species of *Nematoctonus* produce predacious organs in the form of an hour-glass shaped glandular cell covered with a large droplet of sticky fluid (Fig. 1-B,C). Two species, *N. leptosporus* (Fig. 1-H), and *N. tylosporus* secrete a minute droplet of sticky fluid at the pinched off apex of the conidium. *N. haptocladus* forms its droplet on the end of an elongate hyphal growth (Fig. 1-D). Several species, such as *N. concurrens*, *N. leptosporus*, and *N. leiosporus* produce glandular cells and sticky droplets on an erect hyphal process emanating from a conidium (Fig. 1-E,F,G).

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ENTRAPMENT: Nematodes that contact fungal predacious organs attached to hyphae in the substrate are held fast, and, in their thrashing about, they may become attached to several traps in the substrate (Fig. 2). After the victim's struggle subsides (which may take up to 48 hours (5)), the glandular cell puts forth a narrow process that kills the host and eventually fills the body. Hyphae emerging from infected hosts form predacious organs and conidia. If predacious organs attached to the host become detached from the hyphae, infection still occurs. Conidia with a predacious organ attached function as follows: a single conidium produced on a sterigma falls to the substrate and develops a hyphal process from which a gland cell forms, encapsulated by a glistening droplet of mucilaginous fluid (Fig. 1-E). The fungus produces a toxin which causes entrapped nematodes to become immobile and die prior to penetration of the body by hyphae (8).

The teleomorph of *Nematoctonus* is *Hohenbuehelia* (Pleurotus) a gill-forming basidiomycete. Basidiospores discharged into appropriate substrata develop hyphal processes with glandular cells and sticky droplets to entrap nematodes (1).

HABITAT: Leaf mold, decaying leaves and stems, and vegetable refuse.

HOSTS: *Aphelenchus avenae*, *Bunonema* sp., *Ditylenchus* sp., *Eucephalobus* sp., *Mononchus* sp., *Panagrolaimus subelongatus* (Cobb, 1914) Thorne, 1937, and *Paraphelenchus pseudoparietinus* (Micoletzky, 1922) Micoletzky 1925.

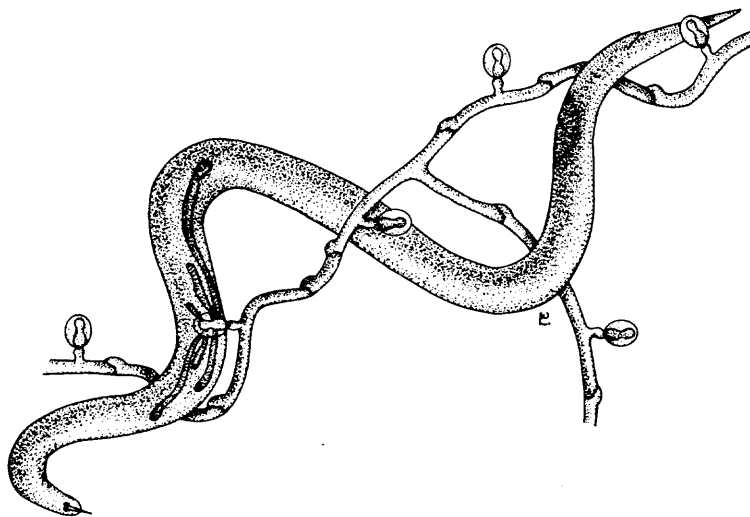


Figure 2. A nematode entrapped by mucilaginous droplets.

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